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September 30, 1992

The Honorable Daniel K. Inouye
Chairman, Subcommittee on Defense
Committee on Appropriations
United States Senate

The Honorable John P. Murtha
Chairman, Subcommittee on Defense
Committee on Appropriations
House of Representatives



We reviewed the Navy's fiscal year 1993 Aircraft Procurement budget request and prior appropriations to determine the status of aircraft acquisition programs. Our objectives were to identify potential reductions to the fiscal year 1993 budget request and potential rescissions of prior year appropriations. We briefed the staff of the Senate Subcommittee on Defense on June 25, 1992, concerning the matters discussed in this report. We also provided a fact sheet on these matters to that Subcommittee staff on September 3, 1992. This report updates and finalizes that briefing.

As shown in table 1, we identified \$399.8 million in potential reductions to the fiscal year 1993 Aircraft Procurement—Navy (APN) budget request.

Table 1: Potential Reductions in APN Programs

Dollars in millions		
Program	Amount requested	Potential reduction
F/A-18 Radar Upgrade	\$237.8	\$237.8
Consolidated Automated Support System (CASS)	162.0	162.0
Total	\$399.8	\$399.8

The Committees may wish to reduce the fiscal year 1993 APN budget by \$237.8 million, the amount requested for 48 F/A-18 upgraded radars and spares. The reason is that operational test results assessing their mission effectiveness will not be available until the end of fiscal year 1995. Further, the Committees may wish to reduce or condition the fiscal year 1993 procurement funding for CASS by about \$162 million pending the successful resolution of all mission-critical technical and operational evaluation testing concerns.

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Additionally, the Committees may wish to condition the obligation of \$247 million in fiscal year 1993 funds for the purchase of F/A-18 engines on the resolution of significant engineering concerns related to substantially reduced life expectancies of engine components. The Navy attributes the reduced life to defective contractor analyses. These issues are discussed more completely in appendix I.

Scope and Methodology

We interviewed budget and program officials and reviewed pertinent program documents and budget support data at Navy program offices. We also analyzed data from prior GAO reports and evaluations and congressional documents. Although written agency comments were not obtained, Navy program officials' comments have been incorporated where appropriate. We conducted our review from March to August 1992 in accordance with generally accepted government auditing standards.

This report is being sent to the Chairmen, Senate and House Committees on Appropriations and Senate and House Committees on Armed Services; the Director, Office of Management and Budget; and the Secretaries of Defense and the Navy. Copies of this report will also be made available to others on request.

This report was prepared under the direction of Richard Davis, Director, Navy Issues, who may be reached on (202) 275-6504 if you or your staff have any questions concerning this report. Major contributors to this report are listed in appendix II.

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Review of Navy's 1993 Budget for Aircraft Procurement

F/A-18 Hornet

The F/A-18 Hornet—a twin-engine, multi-mission, tactical aircraft currently employed in Navy and Marine Corps strike fighter squadrons—is the designated fighter/attack aircraft to replace aging F-14s until the next generation fleet aircraft is introduced.

Engine Procurement

The Navy recently discovered that certain critical F/A-18 engine parts were failing sooner than anticipated. In two cases premature failures resulted in the loss of the engine and damage to aircraft but no loss of life. Included in the fiscal year 1993 Aircraft Procurement—Navy (APN) request is \$247 million for 96 engines to install on new F/A-18 aircraft plus 9 spares at a cost of about \$2.1 million each.

Results of Analysis

The manufacturer of the F/A-18 jet engines had initially calculated the expected service life of the engine and each critical part in it. The Navy is now reevaluating the validity of these calculations and has asked the manufacturer to submit a revised maintenance schedule that would provide for repair or replacement of critical parts before they are expected to fail.

Two F/A-18 aircraft recently had engine failures, one described as catastrophic, that Navy investigators attributed to premature failure of critical engine components. The Naval Safety Center staff defines "catastrophic failure" as a loss in excess of a million dollars. Navy engineers determined that the manufacturer had incorrectly estimated the parts' life expectancies. For example, one part that failed—an engine fan disk—had a manufacturer-estimated life expectancy of 4,700 flight hours, but failed at about its 2,504th hour. The Navy also reduced the expected fatigue life of another engine part from 11,900 flight hours to 2,200. Navy engineers suspect that similar problems may exist in other critical engine parts. They have identified 26 critical engine parts and have begun reestimating their life expectancies and expect this analysis to be completed around October 1993.

The Navy has continued to accept delivery of new F/A-18 engines and is having them installed on newly manufactured aircraft. An F/A-18 program official told us that the current engines are under a warranty that requires the manufacturer to provide replacements, at no cost to the Navy, for parts that fail prematurely. He also told us that, as a result of these failures and the subsequent Navy investigations, the Navy is accepting new F/A-18 engines on a provisional basis and is withholding \$50,000 from final payment to the contractor for each new engine delivered.

Contracting office staff and documents provided indicate that several different warranties apply to each of the engine production buys, allowing for varying degrees of contractor responsibility. Warranty coverage therefore differs with each production buy. Also, a contracting officer told us that it is not clear whether defective parts concerns are a warranty or a latent defect issue. This leaves contractor liability and government cost to repair the engines an unsettled matter.

The Navy is probably not getting as durable an engine as it thought it bought. The reduced life expectancy of these critical engine parts means additional costs to the Navy to buy replacement parts and install them in F/A-18s more often than previously expected. Until the Navy determines the manufacturer's liability for these increased costs, it cannot reasonably determine how much it will cost to operate the F/A-18 fleet over its expected life cycle. This becomes a significant issue as the Navy reduces its operation and maintenance budget and begins development of the next generation F/A-18. Accordingly, the Committees may wish to condition the obligation of \$247 million in fiscal year 1993 APN funds, intended for the purchase of F/A-18 engines, on the resolution of these significant engineering concerns.

Radar Upgrade Program

The Navy is currently conducting a research and development program to upgrade the F/A-18 radar capability. According to Navy documents, it plans to spend about \$1 billion to procure the improved radar (AN/APG-73) by fiscal year 1995. The Navy's 1993 APN budget includes \$237.8 million for 48 radars.

Results of Analysis

In fiscal year 1992 the Congress appropriated \$226.8 million for the Navy to award a low-rate initial production (LRIP) contract for 15 radars. The Navy is asking for \$237.8 million and \$331.1 million in fiscal years 1993 and 1994 to buy 48 and 64 more radars, respectively. A full operational evaluation of the radar upgrade will not be completed until the end of fiscal year 1995.

The Navy requested authorization to produce a total of 127 units under three low-rate initial production buys. The Secretary of Defense's Operational Test and Evaluation staff consider 127 LRIP radars excessive, since fewer radars will be needed to accomplish planned testing.

According to staff of the Secretary of Defense's Director of Operational Test and Evaluation, the radar's test and evaluation master plan is not sufficiently developed to accurately predict how many units will be required for test purposes, but the current estimate suggests about six units.

We have historically recommended against concurrency in development programs because systems with a high degree of concurrency are frequently fielded with major performance flaws. Therefore, since full operational evaluation testing will not be completed before the Navy buys the 127 units under LRIP, the Committees may wish to reduce the fiscal year 1993 APN budget by \$237.8 million, the amount requested for 48 radars and spares, until operational test results are available in 1995.

Consolidated Automated Support System

The Consolidated Automated Support System (CASS) is a standard set of computer-assisted automated test equipment designed to serve as a common diagnostic tool for current and future Navy weapons systems. The Navy developed the system in response to fleet concerns regarding serious deficiencies in existing automatic test equipment and recommendations of an extensive 1976 Secretary of the Navy study on test equipment. The Navy's 1993 APN budget includes \$162 million for 80 units.

Results of Analysis

In a February 12, 1992, technical evaluation, the Navy decided that nine priority one deficiencies must be corrected, seven before CASS could be considered operationally suitable and supportable. The Navy defines priority one deficiencies as deficiencies that affect flight safety or are mission critical. Subsequent operational evaluation results dated July 27, 1992, recommended against fleet introduction until critical operational issues—logistic supportability, compatibility, and interoperability—were corrected and verified. The test report noted that tests did not expose CASS to the rigors of shipboard operations, an intended operating environment. However, on July 15, 1992, the Navy approved the low-rate initial production of 60 units prior to correcting these deficiencies and prior to the availability of operational test results.

Since the Navy entered LRIP prior to completion of operational testing and prior to correcting identified deficiencies, it has little assurance of operational suitability. In view of the significant outlays required, the Committees may wish to reduce or condition the fiscal year 1993 procurement request of \$162 million for 80 additional units plus support

**Appendix I
Review of Navy's 1993 Budget for Aircraft
Procurement**

costs on the resolution of mission-critical technical and operational evaluation testing concerns.

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